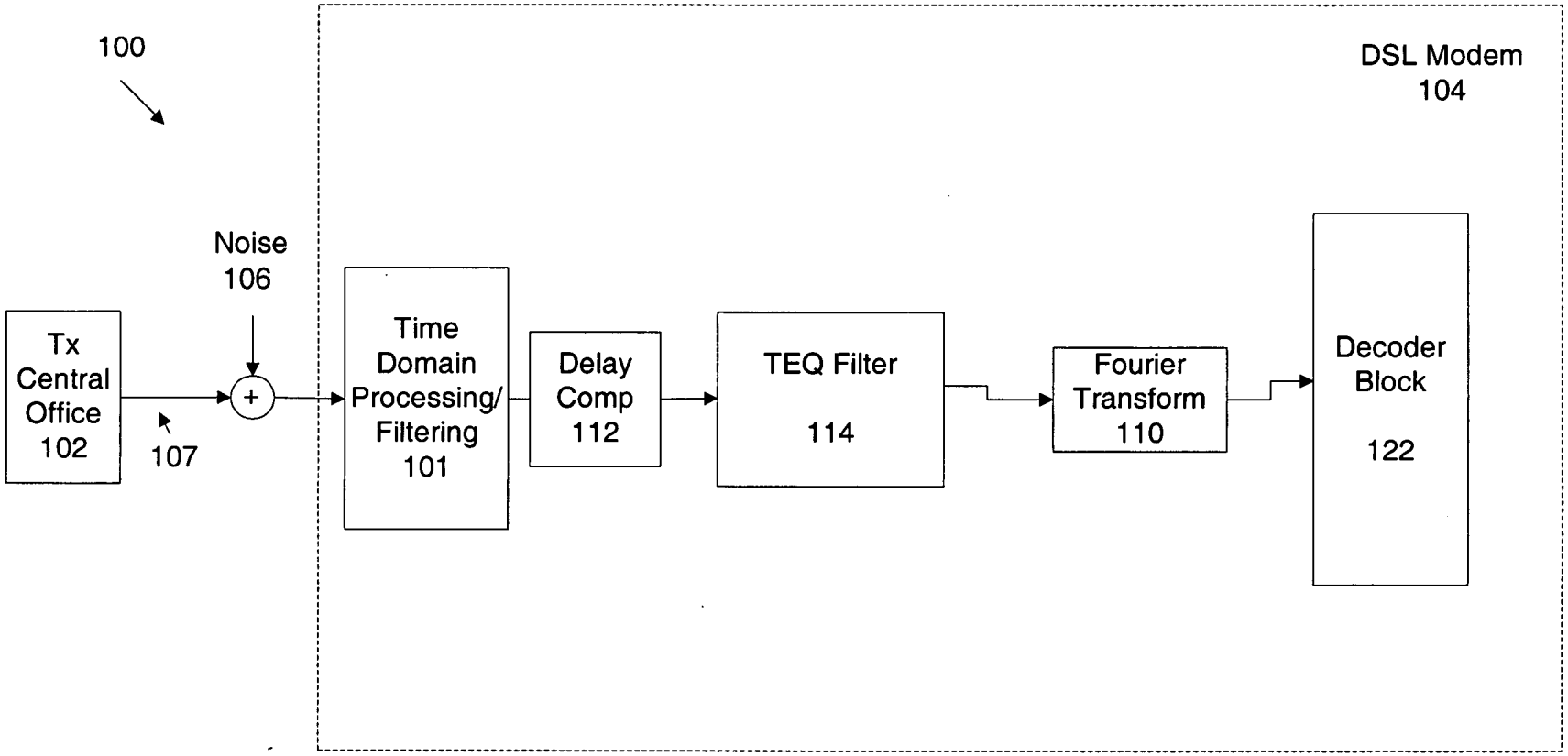
100
DSL Modem
104
Noise
106
Tx
Central
Office
102
107
+
Time
Domain
Processing/
Filtering
101
Delay
Comp
112
TEQ Filter
114
Fourier
Transform
110
Decoder
Block
122

FIG. 1

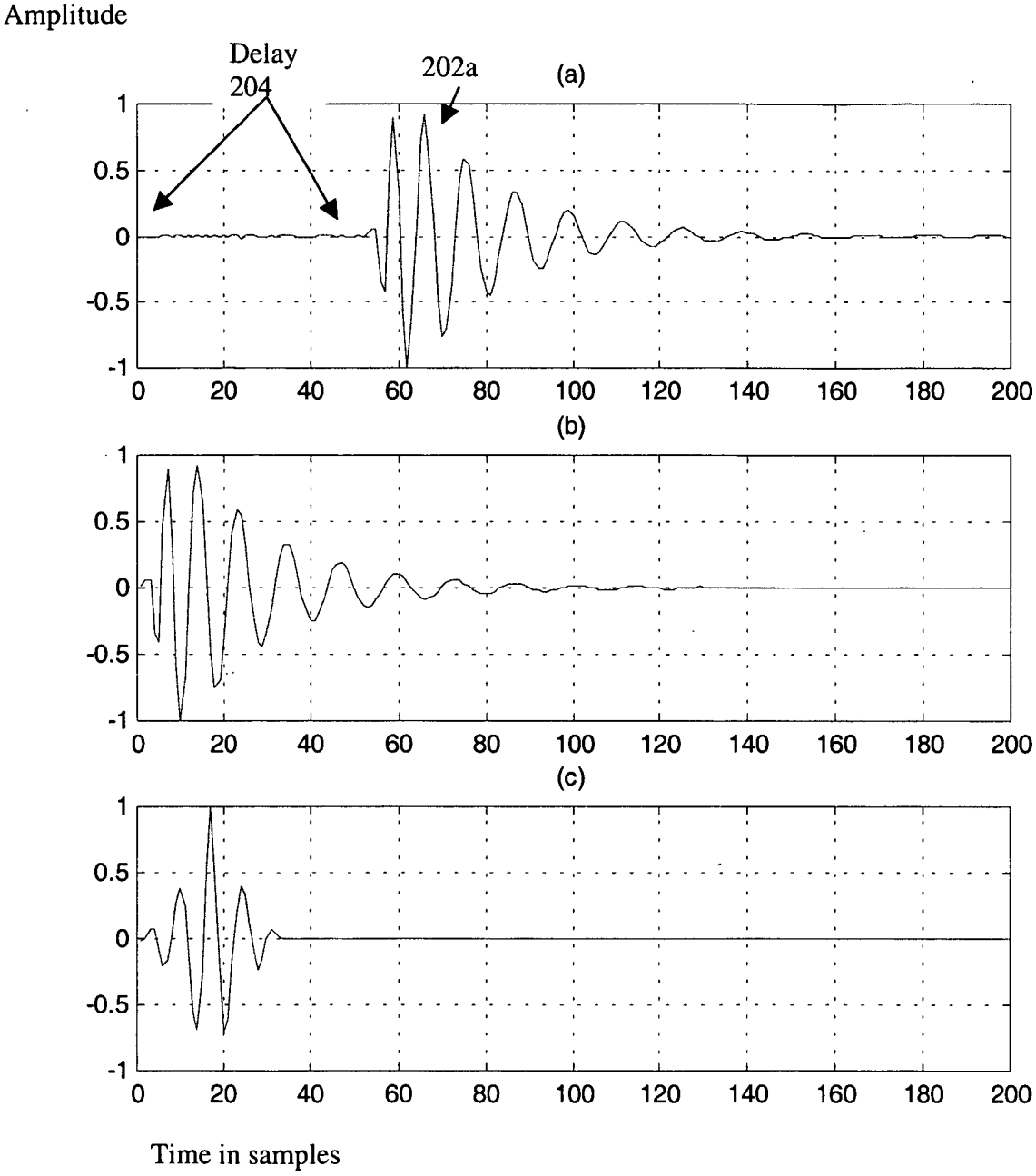
Amplitude
Delay
204
202a
(a)
(b)
(c)
1
0.5
0
-0.5
-1
0
20
40
60
80
100
120
140
160
180
200
Time in samples

Figure 2

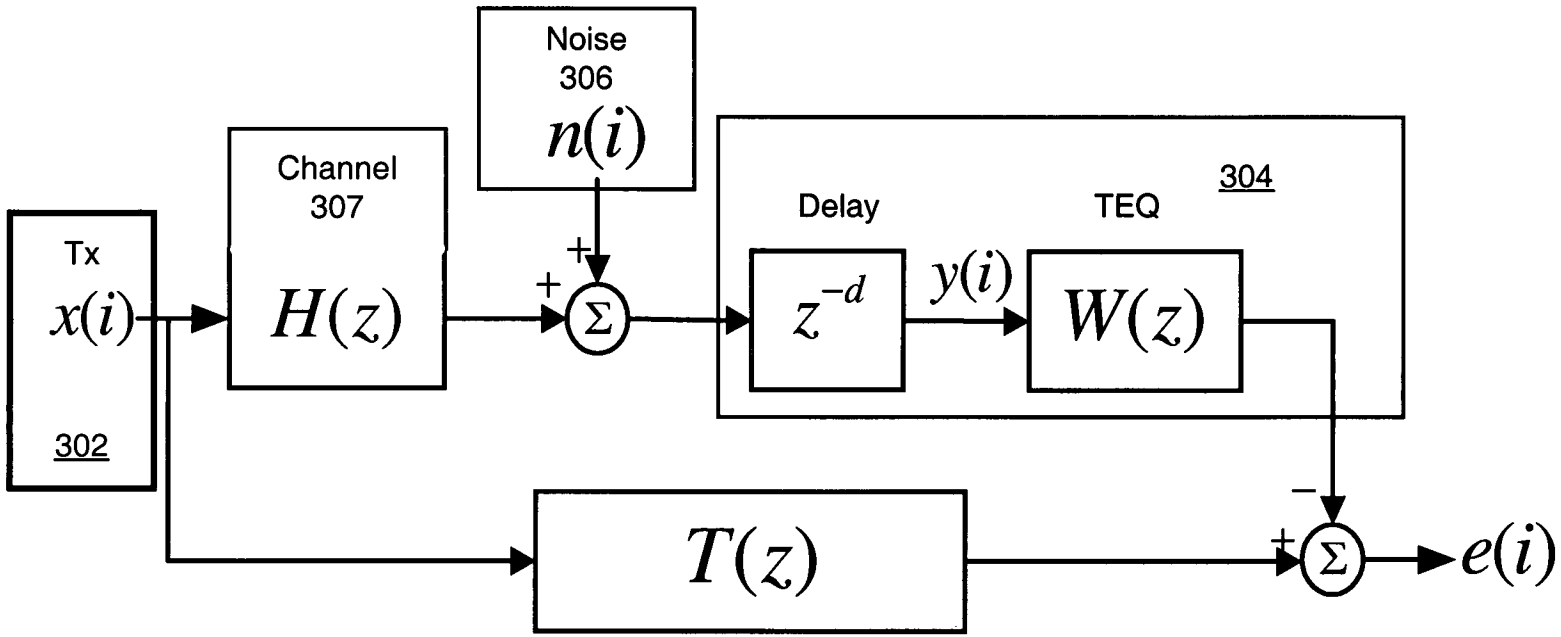
Noise
306
$n(i)$
Channel
307
$H(z)$
Tx
$x(i)$
302
+
+
Σ
Delay
TEQ
304
z^{-d}
$y(i)$
$W(z)$
$T(z)$
−
+
Σ
$e(i)$

Figure 3

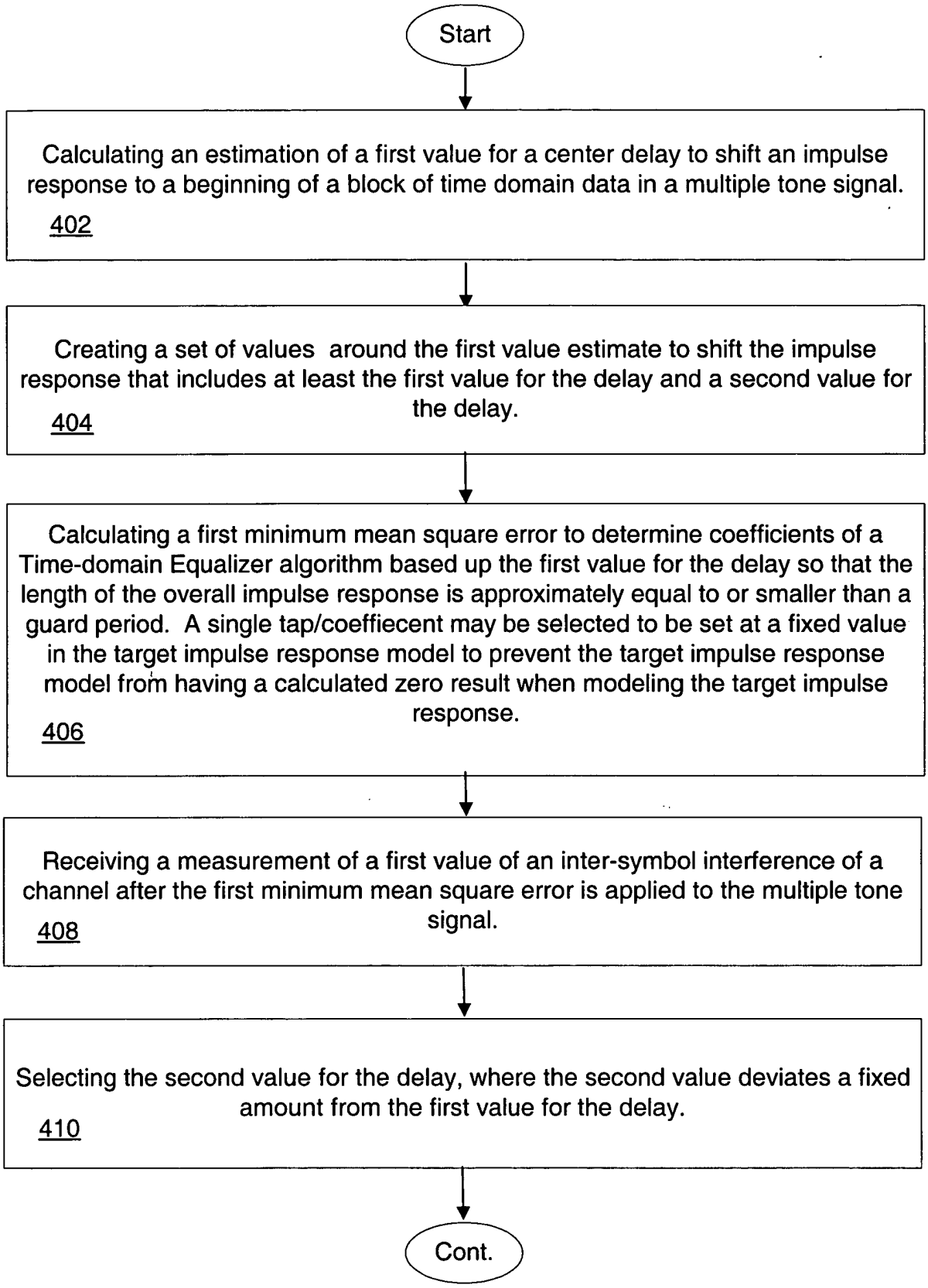
Start
Calculating an estimation of a first value for a center delay to shift an impulse response to a beginning of a block of time domain data in a multiple tone signal.
402
Creating a set of values around the first value estimate to shift the impulse response that includes at least the first value for the delay and a second value for the delay.
404
Calculating a first minimum mean square error to determine coefficients of a Time-domain Equalizer algorithm based up the first value for the delay so that the length of the overall impulse response is approximately equal to or smaller than a guard period. A single tap/coeffiecent may be selected to be set at a fixed value in the target impulse response model to prevent the target impulse response model from having a calculated zero result when modeling the target impulse response.
406
Receiving a measurement of a first value of an inter-symbol interference of a channel after the first minimum mean square error is applied to the multiple tone signal.
408
Selecting the second value for the delay, where the second value deviates a fixed amount from the first value for the delay.
410
Cont.

Figure 4a

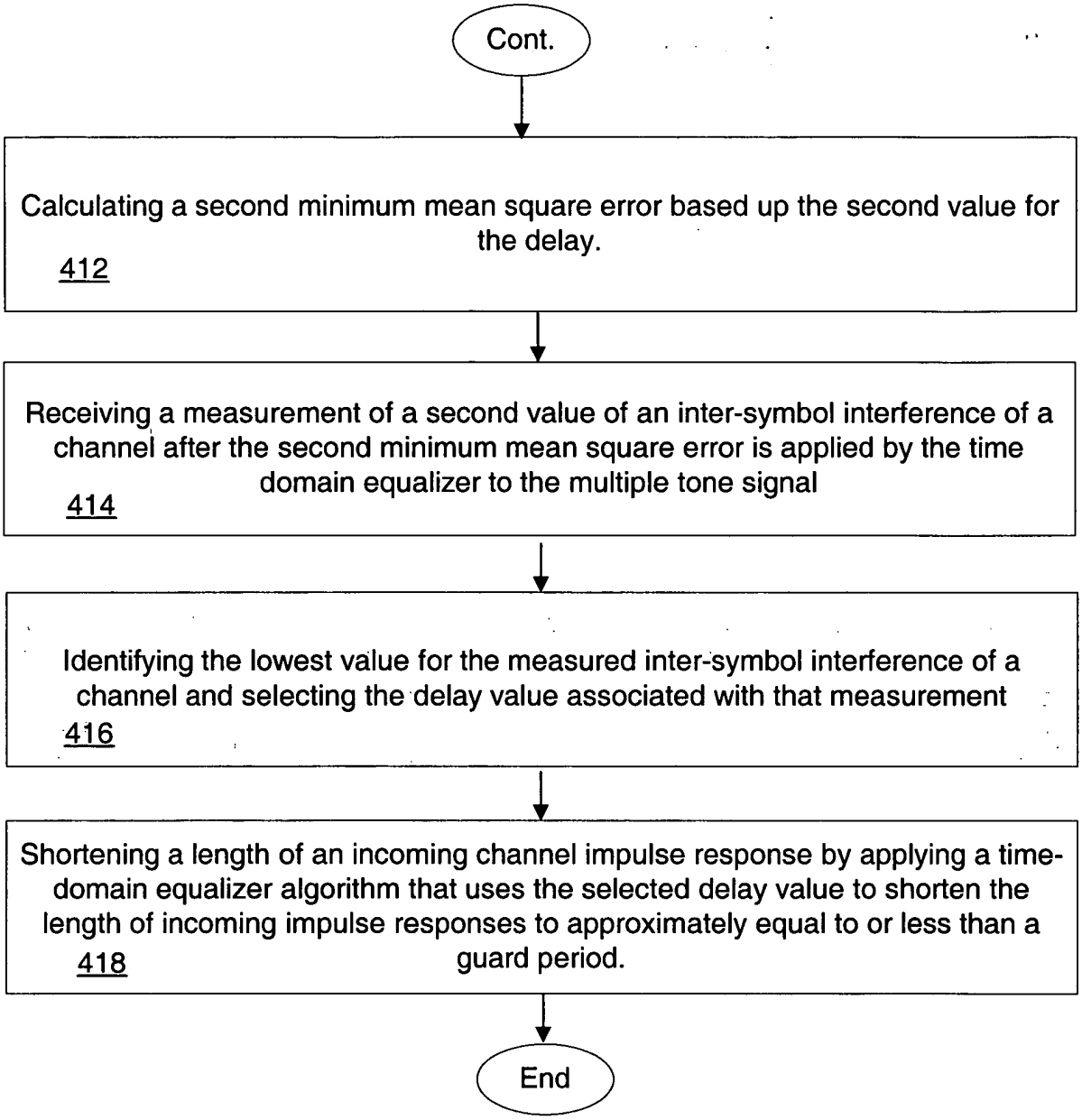
Cont.
Calculating a second minimum mean square error based up the second value for the delay.
412
Receiving a measurement of a second value of an inter-symbol interference of a channel after the second minimum mean square error is applied by the time domain equalizer to the multiple tone signal
414
Identifying the lowest value for the measured inter-symbol interference of a channel and selecting the delay value associated with that measurement
416
Shortening a length of an incoming channel impulse response by applying a time-domain equalizer algorithm that uses the selected delay value to shorten the length of incoming impulse responses to approximately equal to or less than a guard period.
418
End

Figure 4b